SYSTEMS MANAGEMENT

Cost Reduction Strategies

Reducing Operating Costs Using a Systems Energy Approach

Effective systems management practices can yield significant energy and cost savings. For example, U.S. Steel's Edgar Thompson Plant in Braddock, PA, is saving over $2 million annually by implementing the recommendations of its energy team. The plant has now implemented over 40 projects, ranging from repairing steam traps to modifying boilers. Based on the energy savings at this one plant, U.S. Steel has now formed a corporate energy team that initiates and monitors programs at all of its facilities.

If you are thinking about starting an energy management program or improving an existing program at your mill, you will need to review how your utility systems are managed. The following steps offer a simple approach to improving systems management practices:

- First, **identify** the key systems and components.
- Second, **prioritize** energy use systems and components by the size of savings opportunities.
- Third, **take action** and capitalize on the identified opportunities using a well-coordinated plan.
- Fourth, **monitor** operations and maintain your new systems management plan.

Did you know…

Energy typically contributes more than 15% to the cost of manufacturing one ton of steel.

STEP 1 Identify Opportunities

Opportunities for large savings are often discovered in systems that exhibit the following characteristics:

- **Over-designed or conservatively operated.** Conservatively designed and run systems tend to support high reliability and availability, but that could be too much of a good thing. Designing or selecting a system or component to meet the extreme condition that may exist for 10 hours out of every year will usually result in inefficient operation during the remaining 8,750 hours.
- **Over-abundant utility and energy supplies.** Few complaints are ever made about the operational availability of too much heat, water, air, or steam pressure/flow within the mill—these supplies can always be throttled back, recirculated, or simply dumped to the atmosphere when not needed. Though these over-supply designs are surprisingly common, they are inherently inefficient and costly.
- **Lack of monitoring for energy use.** Much of the energy used in industrial plants comes from central sources and is distributed throughout the facility. While plant-wide energy use may be measured, the usage levels of individual components within the facility are seldom noted. As a result, there are no incentives to save energy in specific areas of the plant.

STEP 2 Prioritize

A small fraction of a mill's equipment is often responsible for the majority of excess energy use. Identifying the key systems and equipment opportunities that should be addressed is crucial to saving energy. The following steps can help you narrow the focus:

- **Prioritize by supply**. What is the major energy cost? If your mill spends much more on natural gas than on electricity, you may want to focus on natural gas consumption. If your plant includes an EAF shop, you may want to focus on electrical efficiency improvements.

- **Prioritize by use**. Identify the dominant uses or loads for a selected energy source. A good strategy is to set aside a few hours with several staff members who are familiar with a particular part of the facility and ask them to list the most important 10-20% of the loads in that area according to the following criteria:
  - — Large loads (especially those that run for long periods)
  - — Loads that place special demands on the common supply (e.g., steam, compressed air, electricity)
- **Keep the proper perspective**. The important loads can generally be divided into specific load types (pumps, compressed air, etc.) for further analysis, but don't forget to examine the bigger picture:
  - — Start at the end uses of the system and work back up the energy supply path. For example, look for ways to reduce the flow rate, pressure, or temperature at the end use. End-use reductions tend to yield the greatest energy benefits (e.g., a 10% reduction in temperature may yield a 25% reduction in electricity use).
  - — Keep a hardware systems focus—avoid limiting areas of consideration to components, such as pumps or compressors. Most savings opportunities in industrial facilities are achieved by changing the way a system operates, not by replacing an individual component with a slightly more efficient one.
  - — Keep a life-cycle systems focus—don't make decisions based on costs at just one point in the life cycle, such as initial purchase. Consider the entire life-cycle cost of operation (including energy), maintenance, and reliability.

Remember—You won't be able to do it all at once. Guided by your energy priorities, start pursuing the options that offer the greatest potential savings. Preparing metrics such as return on investment and payback period can help you decide which items to pursue first and help convince your management that they are worthwhile investments.

STEP 3 Take Action

First, ensure that management supports a systems management program. Corporate support will allow you to spend time training staff to recognize and repair energy-related problems. Using the systems analysis and priority-setting approach, create a schedule for component testing, repair, and replacement.

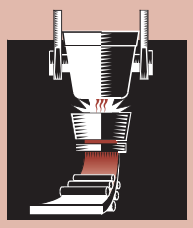
Understanding losses and opportunities can pave the way to near-term savings. For example:

- It may be possible to turn off equipment that is run for convenience or contingency reasons, providing immediate savings at little cost.
- Systems with the largest gap between normal and unusual demand conditions are good candidates for modified designs. Payback is often achieved within a few months.

STEP 4 Monitor

To maximize your energy savings, implement a long-term management system with a continuous improvement approach. Schedule maintenance duties daily and empower staff to identify and minimize problems by fixing them pro-actively.

Document system performance along with fuel consumption, load, and mechanical conditions that impact operations—such records eventually pay for themselves. Incorporating an energy savings program into other company-wide quality, cost, and safety initiatives can help your facility meet its overall goals.



Other Resources

OIT Clearinghouse
800-862-2086

www.oit.doe.gov/
bestpractices

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